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UNAS AND TUNA FISHERIES OF THE WORLD
AN ANNOTATED BIBLIOGRAPHY, 1930-53

By Wilvan G. Van Campen and Earl E. Hoven

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ABSTRACT

This bibliography attempts to list, with descriptive annotations and a subject index, important literature published between 1930 and 1953 dealing with the tunas and their fisheries in all parts of the world. It is thus a continuation of Corwin's (1930) work, which extended with similar scope through 1929, and an extension of Shimada's (1951), which was limited to the biology of Pacific tunas. The tunas with which it deals are those fishes customarily so-called in commercial parlance and usually classified in the genera *Thunnus, Neothunnus, Parathunnus, Germo, Katsuwonus, Euthynnus,* and *Auxis* and their various synonyms. All aspects of the biology of the tunas are dealt with, as are descriptions and histories of all types of tuna fisheries, commercial and exploratory tuna fishing methods and results, fishing gear, catch statistics, and fishery management, but processing technology, economics and marketing, folklore, and purely literary references have been excluded.

TUNAS AND TUNA FISHERIES OF THE WORLD: AN ANNOTATED BIBLIOGRAPHY, 1930-53

By Wilvan G. Van Campen, *Translator*, and Earl E. Hoven, *Librarian*,
Pacific Oceanic Fishery Investigations

This bibliography is an expansion and continuation of that compiled by Shimada (1951) for the biology of the Pacific tunas. It covers the period from the publication of the tuna bibliography of Corwin (1930) to 1953, inclusive, and its geographical scope is world-wide. It incorporates all of Shimada's material except that which antedates 1930.

The subject matter of the bibliography comprises all aspects of the biology of the tunas as well as the tuna fisheries, fishing methods and gear, fishery statistics, laws, and regulations. The subject index following the bibliography provides a detailed outline of its content. Papers dealing exclusively with processing technology, fishery economics and marketing, and material of purely literary or folkloric interest have been excluded.

The compilers have considered as tunas most of the scombroid fishes ordinarily so-called: the albacore (*Germo*), the bluefin (*Thunnus thynnus*) or black tuna (*T. orientalis*), the yellowfin (*Neothunnus*), the oceanic skipjack or striped tuna (*Katsuwonus*), the bigeye and blackfin tunas (*Parathunnus*), and the Australian *T. tonggol* and *T. maccoyii*. The frigate mackerels (*Auxis*) and the little tunnies or black skipjack (*Euthynnus*) have been included, but the bonitos of the genus *Sarda* have not. The compilers were spared having to make any arbitrary decisions as to the status as tunas of such borderline cases as the dogtoothed tuna (*Gymnosarda*), the oriental bonito (*Kishinoella*), and the Spanish mackerels (*Scomberomorus*) by the circumstance of their not finding any papers exclusively concerned with these fishes. Needless to say, the choice of scientific names used in indexing the bibliography is not meant to reflect any taxonomic judgments but is based solely on considerations of convenience and familiarity. The scientific names employed in the various papers are cited without change in the annotations, but have been cross-referred to the appropriate category in the index where there seemed to be no doubt as to the synonymy.

The bibliography is a selective one, not only in the subject matter of the papers cited, but also with respect to their importance. While it has been impossible to set up hard-and-fast criteria of significance, every effort has been made to exclude material of an ephemeral or superficial nature, without overlooking any real contributions to knowledge concerning the tunas and their fisheries. In fields and areas where the literature is comparatively rich, it was possible to be more discriminating; in others more sparsely documented, the compilers had to take whatever they could find. In one case, that of the sizeable mass of annual Progress Reports covering semi-commercial fishing cruises by Japanese prefectural research vessels, which are published year after year with little variation in content, only representative samples of the more recent and comprehensive reports from each Prefecture have been included. In general, the compilers have sought papers of a solid scientific character, but such sources as fishery trade journals have not been passed over when they presented new information not more thoroughly covered elsewhere. Because of the inclusion of a number of papers which the compilers were unable to examine, it is possible that some items of little value have found their way into the collection. As completeness is a bibliographer's ideal most difficult of attainment, there may well be some important contributions that have evaded our search.

Annotations, following in general the pattern of those in Shimada's work, have been supplied for all items. The purpose is not to assess the value or reliability of the paper, but to give a clearer notion of content than can be gathered from a title. Papers which the compilers were not able to examine have the annotation limited to a statement of the categories under which the item was indexed. Some unevenness of treatment in the annotations is due to the fact that the compilers tried to annotate a little more fully than Shimada, but were under the necessity of borrowing his an-

notations verbatim for a number of items that he examined in Japan but could not bring back to the POFI library.

Papers are cited in alphabetical order by the authors' names and in chronological order under each author, and an abbreviated style has been used, the volume immediately following the name of the publication, the number next in parentheses, and the pagination following a colon. Titles of papers in European languages have been left in their original form, but those of Japanese items have been translated. A list is provided of full forms of names of periodicals abbreviated in the citations and of translations of names of Japanese journals. The abbreviations of American and European journal names follow the World List of Scientific Periodicals, 1900-50. Translations of the names of Japanese journals are given in brackets if supplied by the compilers and in parentheses if they appear, or have appeared in the past, on the journal. Japanese journals which have well-known and consistently used English names are cited by them in the bibliography, and the Japanese equivalents are supplied in the list. Japanese names were not abbreviated by the compilers, it being impracticable to do so with their Romanized forms. A few names abbreviated in Chinese characters in Japanese bibliographies have been cited as is, with the compilers' best guess as to their full forms.

A list of the major references and sources consulted in the compilation follows at the end of this introduction. In addition, reports and publications of various marine laboratories, too numerous to mention here, were checked. Often such publications are not indexed. In order to find out what had been published in Russian reports, inquiry was made of the Reference Department of the Library of Congress, and catalogue cards were received for those publications in the collection of the Library of Congress.

The compilers acknowledge gratefully the cooperation of the library staffs of the University of Hawaii, Pineapple Research Institute of Hawaii, Hawaiian Sugar Planters' Association, and the Bernice P. Bishop Museum in making their collections available. Invaluable assistance was given also by staff members of the libraries of the University of California (Berkeley and Los Angeles); Scripps Institution of Oceanography; and the Central Library of the U. S. Department of the Interior, in providing microfilm and photostatic copies of many items in the bibliography.

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Cumulative book index. New York, H. W. Wilson Company.

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Current Caribbean bibliography. Kent House, Port-of-Spain, Trinidad, B. W. I.

Fisheries bulletin. Rome. FAO.

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1941. Oceanography of the North Pacific Ocean, Bering Sea and Bering Strait: a contribution toward a bibliography. Seattle, University of Washington. (Pisces Section, p. 195—227).

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UTINOMI, HUZIO.
1952. Bibliography of Micronesia. Honolulu, University of Hawaii Press. (Pisces section, p. 27—30; Fishery, p. 123—127).

World fisheries abstracts. Rome, FAO.

Zoological record (Pisces Section). London, Zoological Society.

LIST OF ABBREVIATIONS AND TRANSLATIONS OF PERIODICAL TITLES

A. Hancock Pacif. Exped.—Allan Hancock Pacific Expedition. Los Angeles.

Amer. Mus. Novit.—American Museum Novitates. New York.

Ann. biol., Copenhague.—Annales Biologiques. (Conseil Permanent International pour l'Exploration de la Mer.)

Ann. Inst. Océanogr.—Annales de L'Institut Océanographique. Paris.

Ann. Mag. nat. Hist.—Annals and Magazine of Natural History. London.

Ann. S. Afr. Mus.—Annals of the South African Museum. Cape Town.

Arch. Fischereiwiss.—Archiv für Fischereiwissenschaften.

Arch. Zool. exp. gen.—Archives de Zoologie Expérimentale et Générale. Paris.

Atti Conv. Biol. mar.—Atti del 2° Convegno di Biologia Marina. Messina.

Aust. J. Mar. Freshw. Res.—Australian Journal of Marine and Freshwater Research. Melbourne.

Aust. Zool.—Australian Zoologist. Sydney.

Ber. dtsch. Komm. Meeresforsch.—Bericht der Deutschen Wissenschaftlichen Kommission für Meeresforschung. Berlin.

Bibl. Ned. ind. nat. Ver.—Bibliotheek van de Nederlansch Indische Natuurhistorische Vereeniging. Batavia.

Biol. Bull., Shanghai.—Biological Bulletin of St. John's University. Shanghai.

Bol. Comp. Admin. Guano.—Boletín de la Compañía Administratora del Guano. Lima.

Bol. Dep. for. Mex.—Boletín del Departamento Forestal y de Caza y Pesca de Mexico.

Bol. Inst. esp. Oceanogr.—Boletín del Instituto Español de Oceanografía. Madrid.

Bol. Mus. Hst. nat. Prado.—Boletín del Museo de Historia Natural "Janvier Prado". Lima.

Bol. Oceanogr. Pesc., Madr.—Boletín de Oceanografía y Pescas. Madrid.

Boll. Mus. Zool. Anat. comp. Torino.—Bollettino dei Musei di Zoologia e di Anatomia Comparata della R. Università. Torino.

Boll. Pesca Piscic. Idrobiol.—Bollettino di Pesca, di Piscicoltura, e di Idrobiologia. Roma.

Boll. Zool. agr. Bachic.—Bollettino di Zoologia Agraria e Bachicoltura. Torino.

Broch. Sta. océanogr. Salammbô.—Brochure. Station Océanographique de Salammbô. Tunis.

Bull. Amer. Mus. nat. Hist.—Bulletin of the American Museum of Natural History. New York.

Bull. biogeogr. Soc. Japan.—Bulletin of the Biogeographical Society of Japan. Tokyo.

Bull. Fish. Res. Bd. Can.—Bulletin. Fisheries Research Board of Canada. Ottawa.

Bull. Fish. Soc. Philipp.—Bulletin of the Fisheries Society of the Phillippines.

Bull. Inst. océanogr. Monaco.—Bulletin de l'Institut Océanographique de Monaco.

Bull. Japan Sea reg. Fish. Res. Lab.—Bulletin of Japan Sea Regional Fisheries Research Laboratory (Nihonkaiku suisan kenkyūsho kenkyū hōkoku).

Bull. Jap. Soc. sci. Fish.—Bulletin of the Japanese Society of Scientific Fisheries (Nippon suisangakkai shi). Tokyo.

Bull. mar. Sci. Gulf Caribb.—Bulletin of Marine Science of the Gulf and Caribbean. Coral Gables, Fla.

Bull. Pacif. sci. Inst. Fish., Vladivostok.—Bulletin of the Pacific Scientific Institute of Fisheries and Oceanography. Vladivostok.

Bull. physiogr. Sci. Res. Inst. Tokyo Univ.—Bulletin of the Physiographical Science Research Institute, Tokyo University. (Tōkyō daigaku ritchi shizen kagaku kenkyūsho hōkoku). Tokyo.

Bull. Sch. Fish Hokkaido.—Bulletin of the School of Fisheries, Hokkaido Imp. University. Sapporo.

Bull. Scripps Instn. Oceanogr. tech.—Bulletin. Scripps Institution of Oceanography. Technical Series. La Jolla, Calif.

Bull. Serv. Élev. Industr. anim. A. O. F.—Bulletin des Services de l'Élevage et des Industries Animales de A. O. F. Dakar.

Bull. Soc. Océanogr. Fr. — Bulletin de la Société d'Océanographie de France. Paris.

Bull. Soc. portug. Sci. nat. — Bulletin de la Société Portugaise des Sciences Naturelles. Lisbon.

Bull. Soc. zool. Fr.—Bulletin de la Société Zoologique de France. Paris.

Bull. Sta. Aquic. Pêche Castiglione.—Bulletin de la Station d'Aquiculture et de Pêche de Castiglione. Algeria.

Bull. Sta. océanogr. Salammbô. — Bulletin. Station Océanographique de Salammbô. Tunis.

Bull. Tōhoku reg. Fish. Res. Lab.—Bulletin of Tōhoku Regional Fisheries Research Laboratory (Tōhoku kaiku suisan kenkyūsho kenkyū hōkoku).

Bull. U. S. nat. Mus.—Bulletin. United States National Museum. Smithsonian Institution. Washington.

Bur. Fish. Min. Agr. and For.—Bureau of Fisheries. Ministry of Agriculture and Forestry. Japanese Imperial Government. (Suisankyoku. Nōrinshō. Dai Nippon Teikoku Seifu). Tokyo.

C. R. Acad. Sci., Paris.—Comptes Rendus, Académie des Sciences. Paris.

C. R. Ass. Anat.—Compte Rendu de l'Association des Anatomistes. Lisbonne.

C. R. Soc. Biogéographie.—Compte Rendu de la Société de Biogéographie. Paris.

Calif. Div. Fish Game. Bur. Mar. Fish. Mimeogr. Rep.—California. Division of Fish and Game. Bureau of Marine Fisheries.

Calif. Fish Game.—California Fish and Game. Sacramento.

Cent. Fish. Expt. Sta. Rep.—Central Fisheries Experiment Station Reports. (Suisan shikenjō chōsa hōkoku). Tokyo.

Chiba-ken suisan shikenjō jigyō hōkoku.—Progress Report of Chiba Prefectural Fisheries Experiment Station.

Circ. Pac. biol. Sta. Nanaimo.—Circular. Pacific Biological Station, Nanaimo, B. C.

Circ. U. S. Fish Wildl. Serv.—Circular of the United States Fish and Wildlife Service. Washington.

Comm. Fish. Rev.—Commercial Fisheries Review. U. S. Fish and Wildlife Service. Washington.

Contrib. cent. Fish. Sta. Japan—Contributions. Central Fisheries Station of Japan (Suisan shikenjō gyōseki shū). Tokyo.

Contrib. Nankai reg. Fish Res. Lab.—Contributions of Nankai Regional Fisheries Research Laboratory (Nankaiku suisan kenkyūsho gyōsekishū).

Copeia.—Copeia. New York.

Corr. Pesca.—Corriere di Pesca. Roma.

Fauna o. flora.—Fauna och Flora. Uppsala.

Faune ichthyol. Atlan. N.—Faune Ichthyologique de l'Atlantique Nord. Paris.

Fish. Bull. F. A. O.—Fisheries Bulletin. Food and Agriculture Organization of the United Nations. Rome.

Fish Bull., Sacramento.—Fish Bulletin. California (Division of Fish and Game) Fish and Game Commission. Sacramento.

Fishery Bull., U. S.—Fishery Bulletin. Fish and Wildlife Service. Washington.

Fish. Div., FAO, U. N.—Fishery Division of the Food and Agriculture Organization of the United Nations. Washington.

Fish. Invest. (Suppl. Rep.), Imp. Fish. Exp. Sta.—Fishery Investigation (Supplementary Report). Imperial Fisheries Experiment Station. Tokyo.

Fish. Leafl., Wash.—Fishery Leaflet. Washington.

Fischmarkt. Cuxhaven.—Fishmarket. Cuxhaven.

Fish. News Lett. Aust.—Fisheries News Letter, Council for Scientific and Industrial Research, Australia. Melbourne.

Fish. Progr. Rept.—Fisheries Progress Report. Division of Fish and Game, Board of Commissioners of Agriculture and Forestry, Territory of Hawaii.

Fish. Res. Progr. Rep.—See Fish. Progr. Rep.

Fish. Technol. Lect. Ser.—(Suisan seizō kōgaku kōza) [Fishery Technology Lecture Series]. Tokyo.

Formosa Govt.-Gen. Fish Exp. Sta. Publ.—Formosa Government-General Fisheries Experiment Station. Publications. (Taiwan sōtokufu suisan shikenjō shuppan). Kiirun.

Gyorō kenkyūkai kaihō.—[Bulletin of the Fishing Research Society].

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Hokkaidō sui shi junpō (Hokkaidō suisan shikenjō junpō).—[Decadarial Reports of the Hokkaidō Fisheries Experiment Station].

Hoku sui shi sui chō hō.—[Possibly abbr. of Hokkaidō suisan shikenjō suisan chōsa hōkoku, Hokkaido Fisheries Experiment Station, Reports of Investigations].

Hongkong Nat.—Hongkong Naturalist.

Ichth. Contr. Int. Game Fish Assoc.—Ichthyological Contributions of the International Game Fish Association. New York.

Int. Congr. Zool.—International Congress of Zoology.

Int. Rev. Hydrobiol.—Internationale Revue der gesamten Hydrobiologie u. Hydrographie. Leipzig.

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Jap. J. Ichth.—Japanese Journal of Ichthyology [Gyōruigaku zasshi]. Tokyo.

J. Commonw. sci industr. Res. Organ. Aust.—Journal of the Commonwealth Scientific and Industrial Reasearch Organization, Australia. Melbourne.

J. Cons. int. Explor. Mer.—Journal du Conseil Permanent International pour l'Exploration de la Mer. Copenhagen.

J. Coun. sci. ind. Res. Aust.—Journal of the Council for Scientific and Industrial Research, Australia. Melbourne.

J. Fac. Sci. Tokyo Univ.—Journal of the Faculty of Science, Tokyo Imperial University. Tokyo.

J. Fish. Res. Insti.—Journal of Fisheries Research Institute (Suisan kenkyūkai hō). Tokyo.

J. imp. Fish. Exp. Sta.—Journal of the Imperial Fisheries Experiment Station (Suisan shikenjō hōkoku). Tokyo.

J. Mar. biol. Assoc. U. K.—Journal of the Marine Biological Association of the United Kingdom. Plymouth.

J. Pan-Pacif. Res. Instn.—Journal of the Pan-Pacific Research Institution. Honolulu.

J. Tokyo Univ. Fish.—Journal of the Tokyo University of Fisheries. Yokosuka.

Jap J. Zool.—Japanese Journal of Zoology. Tokyo.

Kagaku.—[Science]. Tokyo.

Kagaku nanyō.—[South Sea Science]. Palau.

Kagoshima-ken suisan shikenjō jigyō hōkoku.—[Kagoshima Prefecture Fisheries Experiment Station Progress Reports].

Kagoshima sui sen ken hō.—(Kagoshima suisan semmon gakkō kenkyū hōkoku.).—[Kagoshima Fisheries Vocational School Research Report].

Kaiyō gyogyō.—[Oceanic fisheries]. Tokyo.

Kaiyō no kagaku.—[Science of the sea]. Tokyo.

Kanagawa sui shi geppō (Kanagawa suisan shikenjō geppo).—[Monthly Report of the Kanagawa Prefecture Fisheries Experiment Station].

Katsuo to maguro.—[Skipjack and tuna]. (Organ of Federation of Japan Tuna and Bonito Fisheries Cooperative Associations).

Kumamoto-ken suisan shikenjō jigyō hōkoku.—[Kumamoto Prefecture Fisheries Experiment Station Progress Report].

Maguro gyogyō shiken hōkoku.—[Reports of Tuna Fishing Experiments]. Kanagawa Prefecture.

Mem. Biol. mar.—Memorie di Biologia Marina e di Oceanografia. Messina.

Mem. Bishop Mus.—Memoirs of the Bernice Pauahi Bishop Museum of Polynesian and Natural History. Honolulu.

Mém. Off. Pêches Marit. Sér. Spéc.—Mémoires de l'Office des Pêches Maritimes, Série Spécial. Paris.

Mem. R. Com. Talass. Ital.—Memoria R. Comitato Talassografico Italiano. Venice.

Mid-Pacif. Mag.—Mid-Pacific Magazine. Honolulu.

Mie-ken suisan shikenjō jigyō hōkoku.—[Mie Prefecture Fisheries Experiment Station Progress Report].

Mie sui shi jihō (Mie-ken suisan shikenjō jihō).—[Mie Prefecture Fisheries Experiment Station News Bulletin].

Miyagi no suisan.—[Miyagi Fisheries].

Miyagi Pref. Fish. Exp. Sta.—Miyagi Prefectural Fisheries Experiment Station. (Miyagi-ken suisan shikenjō). Watanoha.

Miyazaki-ken enyō gyogyō shidōsho gyōmu gaiyō. [Brief reports of the Miyazaki Prefecture high-seas fishery-guidance center].

Monogr. Acad. nat. Sci. Philad.—Monographs. Academy of Natural Sciences of Philadelphia.

Nagasaki-ken suisan shikenjō jigyō hōkoku.—[Nagasaki Prefecture Fisheries Experiment Station Progress Report].

Nanyōchō suisan shikenjō jigyō hōkoku.—[Progress reports of the South Seas Government-General Fisheries Experiment Station]. Palau.

Nanyō suisan.—[South Sea Fisheries]. Tokyo.

Nanyō suisan jōhō.—[South Sea Fisheries News]. Palau.

Nat. E. Afr., Nairobi.—Nature in East Africa, Nairobi.

New Engl. Nat.—New England Naturalist. Boston.

N. Z. J. Sci. Tech.—New Zealand Journal of Science and Technology. Wellington.

Nippon kaiyōgakkai shi.—[Bulletin of the Oceanographical Society of Japan]. Tokyo.

Nissan Fish. Res. Sta.—Nissan Fisheries Research Station. (Nissan suisan kenkyūjo). Odawara.

Notas Inst. esp. Oceanogr.—Notas y resúmenes. Instituto Español de Oceanografía. Madrid.

Note Ist. Biol. mar. Rovigno.—Note dell' Istituto Italogermano di Biologia Marina de Rovigno d'Istria. Venezia.

Notes Sta. marit. Cauda.—Notes. Station Maritime de Cauda. Service (Institut) Océanographique et des Pêches de l'Indochine. Saigon.

Ōita-ken suisan shikenjō jigyō hōkoku.—Ōita Prefecture Fisheries Experiment Station Progress Report].

Okinawa-ken suisan shikenjō hōkoku.—[Okinawa Prefecture Fishery Experiment Station Report].

Okinawa-ken suisan shikenjō jigyō hōkoku.—[Okinawa Prefecture Fisheries Experiment Station Progress Reports].

Ōyō kishō.—[Applied Meteorology]. Tokyo.

Pacif. Fisherm.—Pacific Fisherman. Seattle, Wash.

Pacif. Sci.—Pacific Science. Honolulu.

Palao trop. biol. Stud.—Palao Tropical Biological Station Studies. Tokyo.

Pamphl. Coun. sci. ind. Res. Aust.—Pamphlet. Council for Scientific and Industrial Research, Australia. Melbourne.

Pan-Amer. Fish.—Pan-American Fisherman. San Diego.

Philipp. J. Sci.—Philippine Journal of Science.

Proc. Acad. nat. Sci. Philad.—Proceedings of the Academy of Natural Sciences of Philadelphia.

Priroda. Zagreb.

Proc. Gulf and Caribbean Fish. Inst.—Proceedings of the Gulf and Caribbean Fisheries Institute.

Proc. Indo-Pacif. Fish. Coun.—Proceedings. Indo-Pacific Fisheries Council. Bangkok.

Proc. Pacif. Sci. Congr. 6th.—Proceedings of the Pacific Science Congress. Sixth, Berkeley, California.

Proc. U. S. nat. Mus.—Proceedings of the United States States National Museum. Washington.

Progr. Rep. biol. Stas. Nanaimo and Prince Rupert.—Progress Report of the Pacific Biological Station, Nanaimo, B. C., and Pacific Fisheries Experimental Station, Prince Rupert, B. C.

R. Comit. talass. Ital. Mem.—R. Comitato Talassografico Italiano (Istituto Centrale di Biologia Marina in Messina). Memoria.

Rapp. Comm. int. Mer Médit.—Rapport et Procès-verbaux des Réunions. Commission Internationale pour l'Exploration Scientifique de la Mer Méditeranée. Paris.

Rapp. Cons. Explor. Mer.—Rapport et Procès-verbaux des Réunions. Conseil Permanent International pour l'Exploration de la Mer. Copenhagen.

Rec. Albany Mus.—Records of the Albany Museum. Grahamstown.

Rec. Canterbury (N. Z.) Mus.—Records of the Canterbury Museum. Christchurch, N. Z.

Rec. oceanogr. Wks. Jap.—Records of Oceanographic Works in Japan.

Report of Survey for Tuna Fishing (Maguro gyogyō chōsa hōkoku).—See **Tuna Fishing.**

Res. Rep. U. S. Fish Serv.—Research Report. U. S. Fish and Wildlife Service. Washington.

Rev. Sci.—Revue Scientifique. Paris.

Rev. Trav. Inst. sci. tech. Pêches marit.—Revue des Travaux de l'Institut Scientifique et Technique des Pêches Maritimes. Paris.

Rev. Trav. Off. Pêches marit.—Revue des Travaux de l'Office des Pêches Maritimes. Paris.

Ribarski kalendar. Split.

S.-annu. Rep. oceanogr. Invest., Tokyo.—Semi-annual Report of Oceanographical Investigations. Imperial Fisheries Institute. Tokyo.

S. Sea Sci.—South Sea Science (Kagaku nanyō). Palau.

SCAP Nat. Resour. Sect. Rep.—Supreme Commander for the Allied Powers. General Headquarters. Natural Resources Section. Reports. Tokyo.

Sci. Mon., N. Y.—Scientific Monthly. New York.

Sci. Progr. Twent. Cent.—Science Progress in the Twentieth Century. London.

Shizuoka-ken suisan shikenjō jigyō hōkoku. — [Shizuoka Prefecture Fisheries Experiment Station Progress Reports].

Shokubutsu oyobi dōbutsu.—[Plants and animals]. Tokyo.

Smithson. misc. Coll.—Smithsonian Miscellaneous Collections. Washington.

Spec. sci. Rep: Fish., U. S. Fish Wildl.—Special Scientific Report: Fisheries. U. S. Fish and Wildlife Service. Washington.

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Suisan gakkwai hō.—(Proceedings of the Scientific Fisheries Association). Tokyo.

Suisankai.—(Journal of the Fisheries Society of Japan). Tokyo.

Suisan kenkyū shi.—[Journal of Fisheries Research]. Tokyo.

Suisan kōza.—(The text of the Fishery). Tokyo.

Suisan seizō kōgaku kōza.—[Fisheries Technology Lecture Series]. Tokyo.

Suisei.—[Fisheries Administration]. Tokyo.

(Suppl. Rep.) Imp. Fish. Exp. Sta.—(Supplementary Reports) Imperial Fisheries Experiment Station. Tokyo.

Taihoku-shū suisan shikenjō gyōmu hōkoku.—[Taihoku Province Fisheries Experiment Station Progress Report].

Taiwan sōtokufu shikenjō jigyō hōkoku.—[Formosa Government-General Fisheries Experiment Station Progress Report].

Taiwan sōtokufu suisan shikenjō shiken hōkoku, kaiyō chōsa.—[Formosa Government-General Fishery Experiment Station Reports, Oceanographic Investigations.]

Taiwan sōtokufu suisan shikenjō shuppan.—[Formosa Government-General Fisheries Experiment Station, Publications].

Taiwan suisan zasshi.—[Formosa Fisheries Magazine]. Taihoku.

Tech. Pap. Commonw. sci. ind. Res. Organ. Div. Fish., Melb.—Technical Papers. Commonwealth Scientific and Industrial Organization, Australia. Division of Fisheries, Melbourne.

Tech. Rep. Woods Hole oceanogr. Inst.—Technical Report of the Woods Hole Oceanographic Institution. Woods Hole, Mass.

Tōkai daigaku sangyō kagaku kenkyūsho suisan kenkyūbu gyogyō shiryō.—[Tokai University Industrial Science Laboratory, Fishery Research Section, Fishery Data].

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J = in Japanese only.
JE = published in Japan but written in English.
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Distribution, figure, description, brief synonymy.

1931. Le thon rouge et sa pêche, éléments d'un nouveau rapport. Bull. Sta. océanogr. Salammbô 21:165 p. [P]

Thunnus thynnus: figured, synonymy, morphology, compared with *T. secundodorsalis*, biometry, meristic counts, distribution, migrations, spawning, growth, fishing methods, utilization, catch statistics, bibliography.

1932a. Repérage des bancs de thons par avion. Notes Sta. océanogr. Salammbô 26:12 p. [P]

Aerial scouting for tuna schools in trap fishery off Moroccan coast; discussion of application of aircraft to tuna fishing and to the study of tuna migrations.

1932b. Le thon rouge et sa pêche, rapport pour 1931. Bull. Sta. océanogr. Salammbô 29: 168 p. [P]

Thunnus thynnus: figured, synonymy, "facial anomaly," meristic counts, distribution, migrations; tags, hooks, and harpoons figured; spawning, growth; fishing methods and gear, especially purse seine and trap; catch statistics, bibliography.

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Thunnus thynnus: food, migration, spawning, statistics, development, bibliography.

1937. Le thon rouge et sa pêche, rapport pour les années 1933, 1934, et 1935 (9e Rapport). Rapp. Comm. int. Mer Médit. 10:235-315.

Thunnus thynnus: bionomics and fishery.

1938. Le thon rouge et sa pêche. Rapp. Comm. int. Mer Médit. 11:311-358.

Thunnus thynnus: bionomics.

HELDT, H.—Continued

1948. Études sur le thon, la daurade, et les muges. Histoires d'écailles et d'hameçons. Broch Sta. océanogr. Salammbô 1.
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Scale reading; age and growth.

HERALD, EARL S.

1949. Pipefishes and seahorses as food for tuna. Calif. Fish Game 35(4):329. [P]
Euthynnus yaito, yellowfin tuna: stomach contents.

1951. Pseudofins on the caudal peduncle of juvenile scombroids. Calif. Fish Game 37(3): 335-337. [P]
Auxis thazard, Katsuwonus pelamis.

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1932. A check list of fishes recorded from Tahiti. J. Pan-Pacif. Res. Instn. 7(1):3. [P]
Euthynnus alletteratus, E. pelamis, Neothunnus macropterus: listed.

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Euthynnus yaito, Katsuwonus pelamis: listed.

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Katsuwonus pelamis, Neothunnus macropterus: listed.

1936. Fishes of the Crane Pacific Expedition. Zool. Ser. Field Mus. nat. Hist. 21:105-107.
Katsuwonus pelamis, Neothunnus macropterus, Thunnus thynnus: distribution, synonymy, observations on *N. macropterus* fin lengths.

1940. Distribution of the mackerel-like fishes in the western Pacific north of the Equator. Proc. Pacif. Sci. Congr. 6th, vol. 3:211-215. [P]
Auxis thazard, Euthynnus alletteratus, E. yaito, Germo alalunga, Katsuwonus pelamis, Neothunnus macropterus, N. rarus, Parathunnus sibi, Thunnus thynnus: distribution.

1953. Check list of Philippine fishes. Res. Rep. U. S. Fish Wildl. 20:977.
Synonymy, range.

HERRE, ALBERT W. C. T., and A. F. UMALI.

1948. English and local common names of Philippine fishes. Circ. U. S. Fish Wildl. Serv. 14: 128 p. [P]

HERRE, ALBERT W. C. T., and A. F. UMALI.—Continued
Auxis thazard, Euthynnus yaito, Germo alalunga, Katsuwonus pelamis, Neothunnus macropterus: listed.

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Euthynnus yaito: observations of herding of scads, *Decapterus sanctae-helenae,* in the Marshall Is.

HIGASHI, HIDEO.

1940a. Utilization of fishery byproducts from the South Seas (3). Nanyō suisan 6(7):13-20. [J,P]
Bigeye tuna, black tuna, skipjack, yellowfin tuna: ratio of viscera weight to body weight.

1940b. Utilization of fishery byproducts from the South Seas (7). Nanyō suisan 6(12):10-13. [J,P]
Skipjack: ratio of viscera weight to body weight; proportional measurements of various body parts.

1941a. Utilization of fishery byproducts from the South Seas (10). Nanyō suisan 7(3):32-39. [J,P]
Katsuwonus vagans, Neothunnus macropterus: proportional measurements of various body parts; age analysis.

1941b. Utilization of fishery byproducts from the South Seas (14). Nanyō suisan 7(8):36-43. [J,P]
Bigeye tuna, yellowfin tuna: length-weight data; proportional measurements of various body parts; liver figured.

1942. Record of experiments on fishes of the South Seas. Nanyō suisan 8(11):13-27 [J,P]
Katsuwonus vagans, Neothunnus macropterus, Parathunnus sibi: length-weight data; proportional measurements of various body parts.

HIGASHI, HIDEO, and M. HIRAI.

1948. The nicotinic acid content of fish. Contrib. cent. Fish Sta. Japan (1946-1948) 18:129-132.
Skipjack, yellowfin tuna: nicotinic acid content of various body parts.

HILDEBRAND, SAMUEL F.

1946. A descriptive catalog of the shore fishes of Peru. Bull. U. S. nat. Mus. 189:361-372. [P]
Euthynnus alletteratus, Katsuwonus pelamis, Thunnus macropterus: classification; description, synonymy; distribution, food, key. *Thunnus germo, T. thynnus*: key, occurrences recorded.

HIRATSUKA, HITOSHI, and KAKUJI IMAIZUMI.
1934. Experimental fishing and investigation in southern waters by the Shōnan Maru. Taiwan sōtokufu suisan shikenjo jigyō hōkoku (gyorōbu) 1932:97-164. [J,P]
Yellowfin tuna: Indo-Pacific region; length-weight data, fishing conditions in relation to oceanography and weather; catch per unit of effort; distribution.

HIRATSUKA, HITOSHI, and KIYOJI ITŌ.
1934. Report on experimental tuna fishing in the Celebes Sea. Taiwan sōtokufu suisan shikenjō jigyō hōkoku 1934:1-28. [J,P]
Yellowfin tuna: length-weight data; fishing conditions in relation to oceanography and weather; catch per unit of effort; distribution.

HIRATSUKA, HITOSHI, and SEIICHI MORITA.
1935. Correlation between length and weight of yellowfin tuna. Taiwan suisan zasshi 241: 8-10. (Pacific Oceanic Fishery Investigations Translation No. 26. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 22). [P]
Neothunnus macropterus: Celebes Sea; morphometrics.

1936. Correlation between length and weight of yellowfin tuna from the Celebes Sea. Suisan kenkyū shi 31(1):67-68. [J]
Neothunnus macropterus: length-weight relationship; Celebes Sea.

HIRTZ, M.
1933. O tuni i tunolovu. Priroda 23(10):318-320.
Adriatic Sea, fishing gear and methods.

HORIGUCHI, YOSHISHIGE, D. KAKIMOTO, and KENICHI KASHIWADA.
1950. The distribution of inosite in the skipjack (*Katsuwonus pelamis*). Kagoshima sui sen ken hō 1:41-46. [J]
Chemical analysis.

HORIGUCHI, YOSHISHIGE, KENICHI KASHIWADA, and DAIICHI KAKIMOTO.
1953. Biochemical studies on skipjack, *Katsuwonus vagans*. II. Contents of inorganic substances in pyloric caeca. Bull. Jap. Soc. sci. Fish. 18(7):279-282. [Je,P]
Qualitative and quantitative analysis of the inorganic content of the pyloric caeca; quantitative results compared with those from analysis of muscle tissue.

IEHISA, SATORU.
1939. Catch of tunny in the seas south of Kyushu. Bull. Jap. Soc. sci. Fish. 8(3):143-144. [Je,P]
Thunnus orientalis: catches correlated with water temperature.

IKEBE, KENZŌ.
1938. Progress report on skipjack baitfish holding experiments. Nanyō suisan jōhō 2(4): 2-4. [J,P]
Skipjack live bait fishing: mortality of baitfish (*Spratelloides delicatulus?*) held in pound net at Palau; water temperature, salinity, specific gravity.

1939a-1940. Four papers on the morphometry and age of tropical tunas. Nanyō suisan jōhō 3(10):4 p; 4(1):3 p; 4(2):4 p; 4(5):5 p. Pacific Oceanic Fishery Investigations Translation No. 34. In: Spec. sci. Rep: Fish U. S. Fish Wildl. 22). [P]
Length and weight data on *Neothunnus macropterus, Makaira mitsukurii, Parathunnus mebachi,* and *Thunnus germo* from Palau, the Marshalls, and Saipan; ages given based on Aikawa's age-size tables.

1939b. On the age of yellowfin taken in Palau waters. Nanyō suisan jōhō 3(10):4-8. [J,P]
Length-weight data, body condition, sexual maturity; age analysis based on size groups according to Aikawa's tables.

1940a. Age and measurements of tunas in Palau waters. Nanyō suisan jōhō 4(1):2-4. [J,P]
Bigeye tuna, yellowfin tuna, striped marlin: length-weight data, condition factor; age analysis of yellowfin tuna based on size groups in accordance with Aikawa's tables.

1940b. Measurements of yellowfin tuna taken south of the Marshall Islands. Nanyō suisan jōhō 4 (2):2-5. [J,P]
Length-weight data on longline-caught fish, a total of 75 from 6 stations; age analysis based on size according to Aikawa's tables.

1940c. Measurements of albacore and yellowfin tuna taken in Saipan waters. Nanyō suisan jōhō 4(5):63-67. [J,P]
Lengths and weights (gutted) of 8 albacore and 58 yellowfin taken on longlines north of Saipan; age analysis according to Aikawa's size age tables.

1940d. Investigation of tunas in Palau waters. Nanyō suisan jōhō 4(6):2-4. [J,P]
Catches at 14 longlining stations near 7° N., 134°E.; surface temperatures and currents noted; catch rates for yellowfin and spearfishes combined.

1941a. A survey of tuna fishing grounds in the Marshall and Caroline islands. Nanyō suisan jōhō 5(1):6-9. (Pacific Oceanic Fish-

IKEBE, KENZŌ.—Continued

ery Investigations Translation No. 15 In: Spec. sci. Rep.: Fish. U. S. Fish Wild. 47) [P]
Catches from exploratory longlining in the Equatorial Countercurrent; currents at 10 fishing stations recorded; catch rates for tunas and marlins combined.

1941b. Measurements of yellowfin tuna from the Equatorial Countercurrent area. Nanyō suisan jōhō 5(3):5-13. [J,P]
Lengths, weights, sex, and estimated age (from Aikawa's tables) of 188 longline-caught yellowfin from 8 stations in southern Carolines waters.

1941c. A contribution to the study of tuna spawning grounds. Nanyō suisan jōhō 5(4):9-12. [J,P]
South Seas: probable tuna spawning grounds; lengths, weights, and estimated ages of 20 juvenile yellowfin, with dates and positions of capture.

1942. Report of the investigation of tuna fishing in the Timor, Arafura, and Banda seas. Nanyō suisan 8(1):29-41. (Pacific Oceanic Fishery Investigations Translation No. 48. In: Spec. Sci. Rep: Fish. U. S. Fish Wildl. 45) [P]
Bigeye tuna, yellowfin tuna: longline fishing conditions in relation to oceanography; catches and catch rates at 10 stations.

IKEBE, KENZŌ, and TAKESHI MATSUMOTO.

1937. Progress report on experimental skipjack fishing near Yap. Nanyō suisan jōhō 1(4):3-9. (Pacific Oceanic Fishery Investigations Translation No. 6. In: Spec. sci. Rep.: Fish. U. S. Fildl. 46) [P]
Results of 10 days' livebait fishing around Yap: fishing logs; lengths, weights, sex, and condition factor for 83 skipjack; water temperatures and salinities to 200 m. at 8 stations.

1938. Report of a skipjack bait investigation in Saipan waters. Nanyō suisan jōhō 6:2-12. (Pacific Oceanic Fishery Investigations Translation No. 30. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 44). [P]
Common names and descriptions of the species used for livebait at Saipan; results of intensive experimental fishing for livebait.

IKEDA, NOBUYA.

1932. The bait problem and the development of our skipjack and mackerel fisheries. Miyagi no suisan 1:9-29. [J]
Katsuwonus pelamis, Pacific Ocean-northwest; livebait fishing.

IKEDA, NOBUYA, and SEIJI ANDŌ.

1933. A consideration of skipjack fishing conditions off northeastern Japan in 1930. Gyorō kenkyūkai kaihō 5. [J]
Katsuwonus pelamis, Pacific Ocean-northwest.

IKEHARA, ISAAC I.

1953. Live-bait fishing for tuna in the central Pacific. Spec. sci. Rep.: Fish. U. S. Fish Wildl. 107:20 p. [P]
Availability and characteristics of livebait species of the Hawaiian, Line, and Phoenix islands; results of exploratory livebait fishing around these groups; size frequency distribution of yellowfin tuna caught by livebait fishing in Line and Phoenix islands; evaluation of baiting grounds in the area.

IMAI, SADAHIKO.

1950. Studies on flying fishes. 1. On the young of flying fishes eaten by tuna. Kagoshima sui sen ken hō 1:137-148. [J]
Tuna: food.

IMAIZUMI, KAKUJI.

1937. An account of the investigation of tuna fishing grounds in the East Philippine Sea. Taiwan suisan zasshi 271:6-23. [J,P]
Popular account of an exploratory tuna longlining expedition: total catch and catch rates by species for 17 stations; brief remarks on maturity of yellowfin, distribution of catch rates, and oceanographic conditions.

IMAMURA, YUTAKA.

1949. The skipjack fishery. Suisan kōza 6:17-94. (Pacific Oceanic Fishery Investigations Translation No. 32. In: Spec. sci Rep.: Fish. U. S. Fish Wildl. 49). [P]
Auxis hira, A. maru, Euthynnus yaito: Japan; description, distribution, habits. *Katsuwonus pelamis*: Japan; anatomy, description, migration, spawning areas and seasons, food, populations, habits, natural enemies, fishing conditions in relation to oceanography.

1953. The tuna fishery. Suisan kōza 6:104 p. Tōkyō. [J,P]
General account of tuna livebait fishing, purse seining, gillnetting, trolling, and longlining; tables of operating and economic data on Japanese longliners.

INANAMI, YOSHIYUKI.

1940a. Relationship of viscera weight to body weight in yellowfin tuna. Nanyō suisan jōhō 4(2):2-7. [J,P]
Length, weight, body depth, body breadth,

NAKAMI, YOSHIYUKI.—Continued

and weight of gills and viscera for 13 large longline-caught yellowfin; percentage of gill-and-viscera weight in body weight calculated.

1940b. Oceanography and fishing conditions in the sea area centered on Palau. Nanyō suisan jōhō 4(3):5-7. [J,P]

Bigeye tuna, yellowfin tuna: longline fishing conditions in relation to currents and water color.

1940c. Tuna fishing conditions and currents along the eastern coast of the Palau Islands. Nanyō suisan jōhō 4(2):7-10. [J,P]

Bigeye tuna, yellowfin tuna: longline fishing conditions in relation to local currents at 47 stations within 30 miles of the coast.

1941. Report of oceanographic changes and fishing conditions in Palau waters. Nanyō suisan jōhō 5(2):2-6. (Pacific Oceanic Fishery Investigations Translation No. 3. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 42) [P]

Describes the effects of a southward shift of the Equatorial Counter-current on oceanographic conditions and on the skipjack fishing at Palau.

1942a. Oceanographic conditions and yellowfin tuna fishing grounds in South Sea Islands waters. Nanyō suisan jōhō 6(1):2-5. [J,P]

Location of longline fishing grounds in relation to currents, transparency, water color, and water temperature in the equatorial current system between 130°E. and 170°E. longitude.

1942b. Skipjack fishing conditions at Saipan, Truk, and Ponape. Nanyō suisan jōhō 6(1):5-7. [J,P]

Seasonal fluctuations in commercial catch and the size of fish taken.

1942c. Small skipjack caught at Truk. Nanyō suisan jōhō 6(1):7. [J,P]

Records and measurements of two juveniles.

1942d. Grounds fished by tuna boats operating in the Inner South Seas. Nanyō suisan jōhō 6(1): 7-9. [J,P]

Albacore, bigeye, skipjack, yellowfin tuna: fishing conditions in relation to water temperature; seasonal shifts in equatorial longlining grounds at 150°E. to 160°E. longitude.

NOUE, MOTOO.

1953. Albacore fishing conditions and oceanographic conditions in the 1952-53 longlining season. Tōkai daigaku sangyō kagaku kenkyūsho suisan kenkyūbu gyogyō shiryō No. 3:17 p. [J,P]

Thunnus germo: fishing conditions in relation to oceanography, catch per unit of effort; Pacific Ocean—northwest.

INOUE, MOTOO.—Continued

ISAWA, TAKAO.

1935. On the tuna of the Japan Sea coast of Hokkaidō. Hokkaidō sui shi junpō 1935:727-731. [J]

Tuna: distribution; Sea of Japan.

IWATE PREFECTURE FISHERIES EXPERIMENT STATION.

1953a. South Seas tuna fishing experiment report. 1:44 p. [J,P]

Results of an exploratory longlining trip around 10°N., 170°W. Fishing logs; currents, salinities and water temperatures to 300 m., plankton collections; distribution of catch rates for *N. macropterus*, *P. sibi*, and black marlin; length frequency curves, sex ratios and apparent maturity, notes on stomach contents, catch by branch line number and estimated depth; data on shipboard refrigeration and the prices received from each species landed.

1953b. South Seas tuna fishing experiment report. 2:31 p. [J,P]

Results of an experimental longlining trip around 4°N., 175°W. Fishing logs; currents, water temperatures and salinities to 300 m., plankton collections; length frequency distributions for *N. macropterus*, *P. sibi*, and black marlin; catch rates; catch by branch line numbers and estimated depts; prices received for each species landed; sex ratios and apparent maturity.

JAPANESE BUREAU OF FISHERIES.

1933. Report of the southern fisheries investigation for 1931. Bur. Fish. Min. Agr. and For. (1931) 1933:96 p. [J,P]

Results of tuna longlining and purse seining by boats of the training ship Hakuyō Maru in the Celebes Sea and Indian Ocean; shipboard tuna canning experiment; complete logistical and operational data; catch and production (dried fish) of a land-based skipjack fishing operation in Borneo; fishing gear and boats described and figured; yellowfin and bigeye catch, catch rates, weather, and oceanographic data for 19 longline stations; observations of surface schools of skipjack and small yellowfin.

1934. Report of the southern fisheries investigation for 1932. Bur. Fish. Min. Agr. and For.

JAPANESE BUREAU OF FISHERIES.—Continued

(1932) 1934: 347 p. [J,P]

Results of tuna longlining and purse seining by boats of the factory ship Haruna Maru (1,500 tons) off the N. coast of Borneo and the W. coast of Sumatra; complete operational data; results of shipboard canning and freezing experiments; descriptions and figures of fishing gear and boats; daily catches by species by each of 8 boats fishing up to 40 baskets of longlines; catch rates given, positions of sets plotted; yellowfin stomach contents (nonquantitative) recorded for 66 samples of up to 29 fish, together with notes on plankton samples from the same stations; graph plotting yellowfin and bigeye catch rates with transparency and water temperature at 0, 100, and 150 meters.

1935. Report of the southern fisheries investigation for 1933. Bur. Fish. Min. Agr. and For. (1933) 1935: 298 p. [J,P]

Results of tuna longlining and purse seining by boats of the factory ship Haruna Maru (1,500 tons) off south coasts of Sumatra, Java, and the lesser Sundas; complete operational data; shipboard canning and freezing results; fishing logs and catch data for 67 longlining stations; water temperature and specific gravities to 200 m. given as high, low, and average for each of three sections of cruise; total catch rates (all species) given similarly; details of longline and purse seine construction; descriptions of boats used; description of processing techniques; tuna catch comprised yellowfin and bigeye.

1939. Results of encouragement given to the development of albacore fishing grounds during 1938. Bur. Fish., Min. Agr. and For. 1939: 298 p. [J,P]

Detailed results of exploratory albacore longlining by 11 research ships at 28°N.-43°N., 165°E.-165°W. from May to September; track charts and fishing logs; data on surface and subsurface water temperatures and salinities, correlated with catch rates; albacore stomach contents noted; measurement and sex data; catch records also for bigeye, yellowfin, and skipjack.

1940. Results of encouragement given to the development of albacore fishing grounds during 1939. Bur. Fish., Min. Agr. and For. 1940: 173 p. (Translated as Spec. sci. Rep.: Fish. U. S. Fish Wildl. 33). [P]

Detailed results of exploratory albacore longline fishing by 9 research ships at 30° N.-45°N., 163°E.-175°W. from May through October; track charts and fishing logs; data on surface and subsurface water temperatures and salinities, correlated with albacore catch rates; stomach contents noted; measurement and sex data; catch records for bigeye also; data on plankton collections (nonquantitative).

1942. Results of encouragement given to the development of albacore fishing grounds during 1940. Bur. Fish. Min. Agr. and For. 1940: 135 p. [J]

Results of exploratory albacore longlining in the central North Pacific.

JOUBIN, M. (ED.)

1934. Faune Ichthyologique de l'Atlantique Nord, No. 15. Copenhagen, Andr. Fred Høst and Fils (published for Conseil Permanent International pour l'Exploration de la Mer). [P]

Plates including description, synonymy, geographical distribution of: *Germo alalunga, Auxis thazard, Katsuwonus pelamis, Euthynnus alletteratus, Sarda sarda.*

JUNE, FRED C.

1950a. Preliminary fisheries survey of the Hawaiian-Line Islands area. Part 1. The Hawaiian long-line fishery. Comm. Fish. Rev. 12(1):1-23. [P]

Information on the boat, crew, description of gear, bait, setting the line, fishing areas and depths, amount and efficiency of gear used, catch composition.

1950b. The tuna industry in Hawaii. Pan-Amer. Fish. 4(10):11, 19. [P]

Brief description of the skipjack *(Katsuwonus pelamis)* fishery.

1951a. Preliminary fisheries survey of the Hawaiian-Line Islands area. Part 2. Notes on the tuna and bait resources of the Hawaiian, Leeward, and Line Islands. Comm. Fish. Rev. 13(1):1-22. [P]

Includes sea conditions, tuna and bait resources, for the Hawaiian Islands, Leeward Islands, Line Islands, and Canton Island.

1951b. Preliminary fisheries survey of the Hawaiian Line Islands area. Part 3. The live-bait skipjack fishery of the Hawaiian Islands. Comm. Fish. Rev. 13(2):1-18. [P]

Description and notes on biology of skipjack, development of the fishery, fishing boats and crews, bait, fishing methods, fishing areas and seasons.

1952a. Observations on a specimen of bluefin tuna (*Thunnus thynnus*) taken in Hawaiian waters. Pacif. Sci. 6(1):75-76. [P]

Comparison with *Thunnus orientalis;* mor-

JUNE, FRED C.—Continued

phometric measurements and meristic counts of the specimen given.

1952b. An "unusual" yellowfin tuna (*Neothunnus macropterus*) from the waters of the northern Line Islands in the central Pacific Ocean. Copeia 1952 (3):210-211. [P]

Description of a 24-lb. female which because of its coloration at first appeared to be a bluefin tuna (*Thunnus thynnus*) or *Thunnus maccoyi*. Meristic counts and measurements indicated that it was a yellowfin tuna.

1953. Spawning of yellowfin tuna in Hawaiian waters. Fish. Bull., U. S., 54(77):47-64. [P]

Collection and treatment of ovary samples, description of the ovaries, development of the ova, relation of ovary size to fish size as a measure of maturity, number of ova spawned, spawning season, spawning and the fishing season.

JUNE, FRED C., and J. W. REINTJES.

1953. Common tuna-bait fishes of the central Pacific. Res. Rep. U. S. Fish. Wildl. 34:54 p. [P]

Keys and descriptions of families and species of bait fishes; figures; evaluation of tuna bait resources in the central Pacific.

KAFUKU, TAKEICHIRŌ.

1950. On the dark muscle tissue in fishes. (Rep. No. 1.) The dark muscle tissue of the tunas. from the viewpoint of comparative anatomy. Jap. J. Ichth., Tokyo 1(2):89-100. [Je,P]

Tuna: anatomy.

KAGOSHIMA PREFECTURE FISHERIES EXPERIMENT STATION.

1930a. Experimental skipjack fishing. Kagoshima-ken suisan shikenjō jigyō hōkoku (1928):1-18. [J,P]

Results of 11 skipjack livebait fishing cruises off southern Japan, the Ryukyus, and northern Formosa from March to June: fishing logs; surface and subsurface water temperatures at fishing stations.

1930b. Experimental longline fishing for tuna. Kagoshima-ken suisan shikenjō jigyō hōkoku (1928):18-31. [J,P]

Results of 3 longlining cruises from southern Japan to the Ryukyus between November and February; bigeye, yellowfin, and albacore catches, correlated with tides; surface and subsurface water temperatures at fishing stations; fishing logs.

1930c. Experimental fishing by small motor vessels: experimental longline fishing for albacore. Kagoshima-ken suisan shikenjō jigyō hōkoku (1928):54-60.

KAGOSHIMA PREFECTURE FISHERIES EXPERIMENT STATION.—Continued

Results of 2 longlining cruises with a 20-ton vessel in Ryukyu waters in March and April; description of gear; albacore, yellowfin, and bigeye catch, surface and subsurface water temperatures at fishing stations; fishing logs, plots of sets.

1931a. Experimental skipjack fishing. Kagoshima-ken suisan shikenjō jigyō hōkoku (1929):1-16. [J,P]

Results of 10 livebait skipjack fishing cruises in Ryukyu waters between March and June; average monthly surface water temperatures for 7 years; commercial fishing correlated with surface temperatures; a few subsurface temperature data; fishing logs.

1931b. Experimental longline fishing for tuna. Kagoshima-ken suisan shikenjō jigyō hōkoku (1929):16-30. [J,P]

Results of 4 exploratory tuna longlining cruises in Ryukyu waters from October to January; average monthly water temperatures; catches of yellowfin, albacore, and bigeye tuna recorded with surface and subsurface temperatures at the stations, moon phase and tides, transparency; description of gear; plot of station locations and fishing logs.

1932a. Experimental skipjack fishing. Kagoshima-ken suisan shikenjō jigyō hōkoku (1930):1-20. [J,P]

Results of 9 livebait skipjack fishing cruises in Ryukyu waters from March to June; surface water temperature isotherms plotted; fishing logs and plot of station locations.

1932b. Experimental longline fishing for tuna. Kagoshima-ken suisan shikenjō jigyō hōkoku (1930):21-28. [J,P]

Results of 7 exploratory tuna longlining cruises in Ryukyu waters from October to February; catches of yellowfin, bigeye, and black tuna recorded with surface and subsurface temperatures at fishing stations; fishing logs and plot of station locations.

1932c. Experimental longline fishing for albacore and pole and line fishing for mackerel. Kagoshima-ken suisan shikenjō jigyō hōkoku (1930) 54-59. [J,P]

Results of 3 exploratory longlining stations in Ryukyu waters in March; catch (a total of 3 albacore) recorded with surface and subsurface temperatures on the stations; fishing logs and plot of station locations.

KAGOSHIMA PREFECTURE FISHERIES EXPERIMENT STATION.—Continued

1933a. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyō hōkoku (1931): 1-16. [J,P]

Results of 8 exploratory live-bait skipjack fishing cruises in Ryukyu, Formosan, and Philippines waters from March to June; fishing logs and plots of station locations; surface temperatures discussed, isotherms plotted.

1933b. Experimental longline fishing for tuna. Kagoshima-ken suisan shikenjō jigyō hōkoku (1931):16-23. [J,P]

Results of 3 exploratory tuna longlining cruises (23 stations) in Ryukyu waters in October-December; fishing logs and plots of station locations; yellowfin, albacore, and bigeye catch recorded with surface and subsurface temperatures and salinities, transparencies, on the stations; total catch rates averaged by area.

1934. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyō hōkoku (1932): 1-27. [J,P]

Results of 8 exploratory skipjack live-bait fishing cruises in Ryukyu waters from February to June; fishing logs and plot of station locations; water temperature distribution discussed with data on commercial landings at local ports.

1935a. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyō hōkoku (1933): 1-13. [J,P]

Results of 9 exploratory skipjack live-bait fishing cruises in Ryukyu waters from March to June; fishing logs and plot of station locations; water temperature distribution discussed with data on commercial landings at local ports.

1935b. Cooperative South Seas tuna fishing survey. Kagoshima-ken suisan shikenjō jigyō hōkoku (1933):15-21. [J,P]

Results of 4 combination skipjack live-bait and tuna longlining exploratory cruises in the Sulu and Celebes seas by subsidized commercial vessels; catch rates for total tuna, species not recorded.

1936a. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyō hōkoku (1934):1-16. [J,P]

Results of 10 exploratory skipjack live-bait fishing cruises in Ryukyu waters from March to June; discussion of water temperatures and fishing conditions; commercial landings at local ports; lengths and weights of 728 skipjack, average condition factors of samples.

KAGOSHIMA PREFECTURE FISHERIES EXPERIMENT STATION.—Continued

1936b. Cooperative southern skipjack fishing experiment. Kagoshima-ken suisan shikenjō jigyō hōkoku (1934):17-21. [J,P]

Results of 4 exploratory skipjack live-bait fishing cruises in the Sulu and Celebes seas by a subsidized commercial vessel; chart of locations fished; notes on feeding and care of live-bait.

1936c. Investigation of the migration of important fishes. Kagoshima-ken suisan shikenjō jigyō hōkoku (1934):86-87 [J,P]

Release records of 45 skipjack tagged on the caudal peduncle in Ryukyu waters.

1937a. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyō hōkoku (1935) 1-8. [J,P]

Results of 8 exploratory skipjack live-bait fishing cruises in Ryukyu waters from February to June discussed in relation to surface water temperatures; data on landings at local ports by months; average weights, lengths, and condition factors of ten 50-fish samples; distribution of water temperatures and skipjack fishing grounds recorded and plotted for several years; seasonal and annual variations in size composition of the catch; fishing logs and station plots.

1937b. Cooperative southern tuna fishing experiment. Kagoshima-ken suisan shikenjō jigyō hōkoku (1935):9-11. [J,P]

Results of 4 combination skipjack live-bait fishing and tuna longline exploratory cruises to the Sulu Sea; skipjack, yellowfin, and bigeye catches recorded, fishing locations plotted.

1937c. Survey of the present condition of the skipjack fishing industry. Kagoshima-ken suisan shikenjō jigyō hōkoku (1935):96-103. [J,P]

Numbers of skipjack vessels by size classes in the prefecture, their equipment and operating regime; economic and financial data on the fishery.

1938a. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyō hōkoku (1936):1-4. [J,P]

Results of 9 exploratory skipjack live-bait fishing cruises in Ryukyu waters from February to July; discussion of water temperature in relation to fishing conditions; monthly skipjack landings at local ports; average lengths and weights of fifteen 20-fish samples; fishing logs and station plot.

KAGOSHIMA PREFECTURE FISHERIES EXPERIMENT STATION.—Continued

1938b. Cooperative southern skipjack fishing experiment. Kagoshima-ken suisan shikenjō jigyō hōkoku (1936):7-10. [J,P]
Results of 2 exploratory skipjack fishing cruises in the Celebes and Sulu seas from November to February by a subsidized commercial vessel.

1938c. Investigation of the migration of important fishes. Kagoshima-ken suisan shikenjō jigyō hōkoku (1936):89. [J,P]
Release records for 45 skipjack tagged in Ryukyu waters.

1939a. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyō hōkoku (1937):1-3. [J,P]
Results of 7 exploratory skipjack live-bait fishing cruises in Ryukyu waters from March to June; fishing logs and plot of stations; average length and weight of 8 samples of approximately 20 fish; monthly commercial landings at local ports.

1939b. Cooperative southern skipjack fishing experiment. Kagoshima-ken suisan shikenjō jigyō hōkoku (1937):7-9. [J,P]
Results (not very detailed) of 10 days' exploratory skipjack live-bait fishing in the Sulu Sea by a subsidized commercial vessel; chart of locations fished.

1939c. Investigation of the migration of important fishes. Kagoshima-ken suisan shikenjō jigyō hōkoku (1937):69. [J,P]
Relase records of 36 skipjack tagged in Ryukyu waters.

1940a. Experimental skipjack fishing. Kagoshima-ken suisan shikenjō jigyō hōkoku (1938):1-3. [J,P]
Results of 9 exploratory skipjack live-bait fishing cruises in Ryukyu waters from March to July; brief discussion of water temperature and fishing conditions; plot of locations fished; monthly commercial landings at local ports; average lengths and weights of 13 samples of 20 fish each.

1940b. Cooperative southern skipjack fishing experiment. Kagoshima-ken suisan shikenjō jigyō hōkoku (1938):7-9. [J,P]
Results of 4 exploratory skipjack live-bait fishing cruises to the Sulu Sea from October to February by a subsidized commercial vessel.

1940c. Investigation of the migration of important fishes. Kagoshima-ken suisan shikenjō jigyō hōkoku (1938):43. [J,P]
Release records for 20 skipjack tagged in Ryukyu waters.

KAGOSHIMA PREFECTURE FISHERIES EXPERIMENT STATION.—Continued

1941a. Investigation of skipjack fishing. Kagoshima-ken suisan shikenjō jigyō hōkoku (1939):1-3. [J,P]
Results of 10 exploratory skipjack live-bait cruises in Ryukyu waters from March to July; fishing log and station plot; brief discussion of water temperature and fishing conditions; average lengths and weights of 8 samples of 20 fish each; monthly commercial landings at local ports.

1941b. Cooperative southern skipjack fishing experiment. Kagoshima-ken suisan shikenjō jigyō hōkoku (1939):7. [J,P]
Fishing logs for 3 exploratory skipjack livebait fishing cruises to the Sulu Sea from October to January by a subsidized commercial vessel.

KAKIMOTO, DAIICHI, AKIO KANAZAWA, and KENICHI KASHIWADA.

1953. Biochemical studies on skipjack (*Katsuwonus vagans*). IV. Distribution of amino-acid in pyloric caeca. Bull. Jap. Soc. sci. Fish. 19 (6):729-732. [Je,P]
Chemical analysis.

KAMIMURA, TADAO, and MISAO HONMA.

1953. Biology of the big-eyed tuna, *Parathunnus mebachi* (Kishinouye). I. Length frequency of the big-eyed tuna caught in the North Pacific with special reference to biennial frequency. Contrib. Nankai reg. Fish. Res. Lab. 1, Contrib. 46:18 p. [Je,P]
Analysis of size composition of bigeye landed by longlines from 130°E. to 165°W. north of 26°N. from 1948 through 1953; compared for areas and years; discussion of reproduction, growth, and migration.

KANAGAWA PREFECTURE FISHERIES EXPERIMENT STATION.

1951a. Report of South Sea tuna fishing experiments, 1951. 49 p. [J,P]
Detailed results of a longlining cruise to 0°-6°N., 154°-162°E. in January-March: distribution, longline catch rates, relative depth of capture, length frequencies, sex ratios, stomach contents for yellowfin and bigeye tuna. Subsurface water temperatures, salinities; notes on plankton.

1951b. Report of work of the Kanagawa Prefecture Fisheries Experiment Station, 1950:1-107. [J,P]
Results of 5 longlining cruises between 5°-38°N. and 150°-175°E. Yellowfin, bigeye, and albacore catch rates, length frequencies, sex ratios, stomach contents (nonquantitative); relative depth of capture; subsurface water temperatures and sali-

KANAGAWA PREFECTURE FISHERIES EXPERIMENT STATION. —Continued

nities, notes on plankton; fishing logs, *N. macropterus* and *P. mebachi* recorded from stomach contents; shipboard refrigeration experiments.

1952a. Report of experimental tuna fishing on the eastern grounds by the Sagami Maru. Maguro gyogyō shiken hōkoku 4:21 p. [J.P]

Report of an exploratory longlining cruise in Feb.-Mar. around 32°N., 171°E. Catch rates of albacore and bigeye; average sizes; length frequency distribution of albacore; estimated depth of capture; sex ratios; water temperatures and salinities to 300 m.; fishing correlated with oceanographic conditions. Complete fishing logs.

1952b. Report of experimental tuna fishing on the eastern grounds by the Sagami Maru. Maguro gyogyō shiken hōkoku 5:26 p. [J,P]

Report of an exploratory longlining cruise in Feb.-Apr. around 30°N., 175°E. Albacore and bigeye catch rates, sex ratios, length frequency distribution; water temperature and salinities to 300 m., correlated with fishing conditions; catch by branch line number. Complete fishing logs.

KANAI, MOTO, and NOBORU KASU.

1938. Report of an investigation of the economics of the Okinawan tuna longline and deep-sea handline fisheries. Okinawa-ken suisan shikenjō hōkoku 1:1-42. [J,P]

History of the fishery, charts of grounds showing expansion, fishing seasons; description and figures of gear and vessels; list of vessels, catch statistics; economics of the fishery: costs of gear, provisions, bait, fuel.

KANAMURA, MASAMI, and KAKUJI IMAIZUMI.

1936a. Report of experimental tuna longlining east of Formosa. In Report of experimental fishing by the Shonan Maru in 1935. Taiwan sōtokufu suisan shikenjō shuppan 3:165-202. [J,P]

Results of fishing at 21°-23°N., 121°-126° E. in Nov.-Dec. Gear dimensions, station plot, fishing log, weather, surface and subsurface temperature and salinity, transparency, water color; yellowfin, bigeye: catch rates, depth of capture; body temperature, sex, maturity, length, weight of 25 yellowfin and 3 bigeye; shark damage rate; tuna catch and water temperature correlated.

1936b. Fishing conditions for tuna longline boats based at Takao. Taiwan sōtokufu suisan shikenjō shuppan 3: 203-207. [J,P]

Operational data (average cruises per season, Oct.-May, average fishing effort, average catch per cruise by species) for 7 commercial boats fishing the Celebes, Sulu, and S. China Seas; plots by 1° squares of catch rates for yellowfin and bigeye.

KANAMURA, MASAMI, and KAKUJI IMAIZUMI.—Cont.

KANAMURA, MASAMI, and HARUO YAZAKI.

1940a. Investigation of tuna longline fishing grounds in the East Philippine Sea. In Report of fishing ground investigations by the Shonan Maru in 1937. Taiwan sōtokufu suisan shikenjō shuppan 21:1-65. [J,P]

Results of exploratory longlining at 3°-20°N., 123°-131°E. in June-Sept. Fishing log, track chart and station plot; setting, hauling, and soaking time; construction of gear. Subsurface temperatures and salinities, transparency, water color at stations. Yellowfin, bigeye, skipjack, albacore catch rates; depth of capture; catch rates plotted against latitude; stomach contents (nonquantitative); sex and maturity; body temperature (compared with water temperature); length, weight, length-weight relation, age according to Aikawa's tables, condition factor; correlation of yellowfin catch with water temperature, salinity, currents, and weather examined; shark damage rates.

1940b. Investigation of tuna longline fishing grounds in the South China Sea. In Report of fishing ground investigations by the Shōnan Maru in 1937. Taiwan sōtokufu suisan shikenjō shuppan 21:67-117. [J,P]

Results of exploratory longlining at 16°-22°N., 116°-121°E. in Feb.-May. Fishing log with operational data, track chart and station plot; gear construction. Subsurface temperatures and salinity, transparency, water color at stations. Yellowfin, albacore: catch rates; depth of capture; stomach contents (non-quantitative); body temperature, compared with water temperature; length, weight, age according to Aikawa's tables, condition factor, sex and maturity; correlation of dark or "green" flesh color with kind of feed, condition factor, and sexual maturity attempted.

KASHIWADA, KENICHI, DAIICHI KAKIMOTO, and YOSHISHIGE HORIGUCHI.

1952. Biochemical studies on skipjack *(Katsuwonus vagans)*. I. Chemical components of pyloric caeca and extractive matter. Bull. Jap. Soc. sci. Fish. 18(4):147-150. [Je,P]

Fat, moisture, ash, protein content; changes in nitrogen compounds by autolysis.

ASHIWADA, KENICHI, DAIICHI KAKIMOTO, and TOSHIMORI YAMASAKI.

1953. Biochemical studies on skipjack. III. On the nitrogen compounds in skipjack pyloric caeca extract. Bull. Jap. Soc. sci. Fish 19(1): 15-18. [J,P]

Chemical analysis.

ATŌ, GENJI.

1940. An account of longline fishing for tuna. Nanyō suisan jōhō 4(7): 8-10. [J,P]

General account of a longlining trip in Palau waters: brief notes on yellowfin sex ratio and maturity, on soaking time and bait loss, and on working efficiency of the fishermen.

AWAMURA, HYŌZŌ.

1939. Observations on oceanography and fishing conditions in Palau waters. Nanyō suisan jōhō 3(1):2-6. [J,P]

General discussion of yellowfin and skipjack fishing in relation to ocean currents in the Palau area.

AWANA, TAKESHI.

1934. On the relation between the tuna fishery and oceanographic conditions. Hokkaidō suisan shikenjō suisan chōsa hōkoku 31:80 p. (Spec. sci. Rep.: Fish. U. S. Fish. Wildl. 78). [P]

Thunnus orientalis, northern Japan: catch statistics; fishing conditions related to temperature, currents, abundance of other fishes, sunspots, lunar period, wind direction; monthly average size of fish in commercial landings; tag recovery records for 6 fish.

1935. The tuna spawns in the Japan Sea. Suisan kenkyū shi 30:284-286.

Black tuna: spawning.

1937. The catch of tunny, *Thunnus orientalis* T. and S., off Kushiro, Hokkaido, in relation to the vertical difference in water temperature. Bull. Jap. Soc. sci. Fish. 6(2):73-74. (Pacific Oceanic Fishery Investigations Translation No. 50. In: Spec. sci. Rep.: U. S. Fish Wildl. 52. [P]

Temperature difference between surface and 50 m., and average numbers of large, medium, and small fish taken per trip in 13 years; Pacific Ocean-northwest.

1938. On tuna fishing conditions at Urakawa. Hoku sui shi sui chō hō 43:125-134. [J]

Thunnus orientalis: fishing conditions, Pacific Ocean - northwest.

AWASAKI, TSUYOSHI.

1952. On the populations of the skipjack, *Katsuwonus pelamis* (Linnaeus), migrating to the Northeastern Sea Area along the Pacific coast of Japan. Bull. Tōhoku reg. Fish. Res. Lab. 1:1-14. [Je,P]

Populations distinguished by size composition, condition factor, and biting qualties; distribution correlated with oceanographic conditions; length-weight relation; age determination (according to Aikawa's tables); Pacific Ocean-northwest.

KIDA, TAKEO.

1936. On the surface temperature of water in the tunny fishing grounds off Kushiro and Urakawa in summer. Bull. Jap. Soc. sci. Fish. 5(2):87-90. [Je,P]

Thynnus thynnus: fishing condition correlated with water temperature; size composition of schools; relation to other fishes, birds, plankton; Pacific Ocean-northwest.

KIKAWA, SHŌJI.

1953. Observations on the spawning of the bigeyed tuna (*Parathunnus mebachi* Kishinouye) near the southern Marshall Islands. Contrib. Nankai reg. Fish. Res. Lab. 1, Contrib. 24:10 p. [Je,P]

Mature and ripe fish abundant in longline catch in southern Marshalls, June-August; occurrence of ripe fish in relation to area, oceanographic conditions, month, and size composition; ripe eggs described and figured; successful artificial fertilization described and embryo figured.

KIMURA, KINOSUKE.

1932. Growth curves of blue-fin tuna and yellowfin tuna based on catches near Sigedera, on the west coast of Prov. Izu. Bull. Jap. Soc. sci. Fish. 1(1):1-4. (Pacific Oceanic Fishery Investigations Translation No. 37. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 22). [P]

Neothunnus macropterus, Thunnus orientalis: growth rates determined from size groups; Pacific Ocean-northwest.

1933. Statistical analysis of the catch of young bluefin tuna and yellowtail in Suruga Bay. Bull. Jap. Soc. sci. Fish. 2(4):183-194. [Je,P]

Thunnus orientalis: trap catches correlated with area and with season; Pacific Ocean-northwest.

1935. Statistical analysis of the catch by keddle nets, along the coast of Suruga Bay. Rec. oceanogr. Wks. Jap. 7(1):1-36.

Neothunnus macropterus, Thunnus orientalis: Pacific Ocean-northwest; seasonal distribution of trap catches, 1927-32; weight frequencies; age-growth curves.

1941. Skipjack fishing conditions. Suisan seizō kōgaku kōza 1:36 p. [J]

Northwest Pacific Ocean: distribution, mi-

KIMURA, KINOSUKE.—Continued

gration, catch correlated with water temperature; age and size composition of commercial catches.

1942a. Tuna and spearfish fishing conditions. Suisan seizō kōgaku kōza 5:122 p. [J,P]
Albacore, yellowfin, bigeye tuna; northwest Pacific, Indonesian waters; landings from various longlining grounds (1936-40), fishing seasons, catch per day fished, relation of water temperature to fishing conditions; age (from Aikawa's tables) and rough size composition of albacore and yellowfin catches.

1942b. High seas fisheries. Kaiyō no kagaku 2(3): 142-7. [J,P]
Albacore, black tuna, skipjack, bigeye, yellowfin; popular account of livebait fishing and longlining grounds and seasons, relation to water temperature; proportion of skipjack landings from various areas, 1937-39.

1949. Atlas of skipjack fishing grounds—with data on the albacore grounds. Tokyo. Kuroshio Publ. Co., 44 p. [J,P]
Japan: catches of albacore and skipjack in relation to surface water temperature; chart of fishing situation and isotherms for each 10-day period of the year.

KIMURA, KINOSUKE, and KAZUMI ISHII.

1931. Fishing conditions in the northeastern part of Suruga Bay (Part 1). Tunas and spearfishes and their young. Suisan butsuri danwakai kaihō 33:526-538. [J]
Pacific Ocean - northwest: tuna, young.

1932. Fishing conditions in the northeastern part of Suruga Bay (Part 2), with the growth rates of black tuna and yellowfin based on catches from the Shigedera fishing grounds. Suisan butsuri danwakai kaihō 38:562-580. [J]
Thunnus orientalis and *Neothunnus macropterus*: growth, fishing conditions; Pacific Ocean-northwest.

1933a. Statistical analysis of the catch at the northeastern end of Suruga Bay. I. Bluefin tuna (*Thunnus orientalis* T. and S.). Bull. Jap. Soc. sci. Fish. 1(5):221-229. [Je,P]
Size composition, fishing conditions correlated with season; Pacific Ocean-northwest; annual and seasonal variations in catch and sizes of fish in Japanese tuna traps.

1933b. Statistical analysis of the catch at the northeastern end of Suruga Bay. II. Yellowfin tuna, swordfish, yellowtail, etc. Bull. Jap. Soc. sci. Fish. 2(2):69-79. [Je,P]

KIMURA, KINOSUKE, and KAZUMI ISHII.—Continued

Seasonal distribution of trap catches; correlation with water temperature; Pacific Ocean-northwest.

KIMURA, KINOSUKE, MITSUO IWASHITA, and TOSHIRŌ HATTORI.

1952. Image of skipjack and tuna recorded on echo sounding machine. Bull. Tōhoku reg. Fish. Res. Lab. 1:15-19. [Je,P]
Depth recorder traces of skipjack, albacore, and bigeye schools; notes on vertical distribution and schooling habits.

KODAMA, MASAHARU, K. IIZUKA, and T. HARADA.

1934. Weight ratio of various body parts and analyses of the normal constituents of fresh flesh of important South Sea fish. Taiwan sōtokufu suisan shikenjō jigyō hōkoku (1932), Technol. Sect. 1-6. [J,P]
Skipjack and tuna examined.

KOYASU, SHŌZŌ.

1931. On the skipjack fishing conditions off eastern Honshū. Suisankai 579:2-25; 580-24-30. [J]
Katsuwonus pelamis: fishing conditions, Pacific Ocean-northwest.

KREUTZER, CONRADIN.

1951a. Ein elektrisches Thunfischangelgerät. Arch. Fischereiwiss. 3(1/2).
Fishing methods and gear; North Sea.

1951b. Thune werden elektrisch geangelt. Fischereiwelt 3(10):160-1. [P]
Description and figure of electrified hook, line, and accessories for stunning tuna.

KUMAMOTO PREFECTURE FISHERIES EXPERIMENT STATION.

1946. Experimental pole and line fishing for skipjack. Kumamoto-ken suisan shikenjō jigyō hōkoku (1942, 1943, 1944):3-5. [J,P]
Summary results of 4 cruises off southern Japan in July-Nov. Surface water temperatures discussed.

KUMATA, TŌSHIRO, ET AL.

1941. Illustrated atlas of edible marine animals and plants of the South Seas. Nissan Fish. Res. Sta., p. 62, 65. [J]
Katsuwonus vagans, Neothunnus macropterus, Parathunnus mebachi: distribution; English and Japanese common names, figures, Dutch and Malay common names of *N. macropterus*, and *P. mebachi*.

KURONUMA, KATSUZŌ.

1940. A young of ocean sunfish, *Mola mola*, taken from the stomach of *Germo germo*, and a specimen of *Masturus lanceolatus* as the second record from Japanese waters. Bull. biogeogr. Soc. Japan 10(2):25-28. [JE]
Stomach contents of *Germo germo* noted.

URONUMA, KATSUZŌ, TAKEICHIRŌ KAFUKU, and SHŌJI KIKAWA.
1949. Report of investigations of skipjack and tuna resources in 1947 by the Nakamura research staff. Cent. Fish. Exp. Sta. Rep. 1:7 p. (Pacific Oceanic Fishery Investigations Translation No. 33. In: Spec. sci. Rep.: Fish. U. S. Fish Wildl. 17). [P]
Katsuwonus pelamis, central and south Japan; morphometric data, meristic counts; size composition and sex ratio of commercial catch; sexual maturity, gonad weights, egg counts; stomach contents; catch statistics; fishing grounds and seasons.

E DANOIS, E.
1933. Les transgressions océaniques. Bull. Inst. océanogr. Monaco 613:1-16.
Germo alalunga, Thunnus thynnus: occurrence in relation to water temperature and salinity; Atlantic Ocean.

1938. L'influence des transgressions sur la biologie et la pêche. In: L'Atlantique (Histoire et Vie d'un Océan), p. 246-286. Paris, Albin Michel.
Germo alalunga: races, migrations.

1951. Sur la présence du thon blanc ou germon sur les côtes du Venezuela et sur le lieu de ponte de cette espèce dans l'Atlantique Nord. C. R. Acad. Sci. Paris 232:1029-1030.
Thunnus (*Germo*) *alalunga;* Atlantic Ocean, Caribbean Sea: spawning, migration; Sargasso Sea as probable spawning ground.

E GALL, J.
1934a. *Auxis thazard.* In: Faune Ichthyologique de l'Atlantique Nord, No. 15. [P]
Plate including description, synonymy, distribution.

1934b. *Euthynnus alletteratus.* In: Faune Ichthyologique de l'Atlantique Nord, No. 15. [P]
Plate including description, distribution, synonymy.

1934c. *Germo alalunga.* In: Faune Ichthyologique de l'Atlantique Nord, No. 15. [P]
Plate including description, distribution, synonymy.

1934d. *Katsuwonus pelamis.* In: Faune Ichthyologique de l'Atlantique Nord, No. 15. [P]
Plate including description, distribution, synonymy.

1949. Germon. Résumé des connaissances acquises sur la biologie du germon. Rev. Trav. Off. Pêches marit. 15:1-42. [P]
Germo alalunga: synonymy, common and scientific names; systematics, figure, measurement data; digestive, respiratory, and circulatory apparatus; reproduction, distribution (geographical and vertical), food, parasites, age and growth, migration, larvae; bibliography.

LE GALL, J.—Continued
1951. Ichthyométrie des Thonidés. De l'emploi d'une technique internationale. J. Cons. int. Explor. Mer 17(3):267-273. [P]
Attempt to standardize techniques in taking morphometric measurements.

LEGENDRE, R.
1932. La nourriture du germon (*Germo alalunga* Bonnaterre). Arch. Zool. exp. gén. 74:531-540. [P]
Stomach contents of *Germo alalunga.*

1933. Présence d'*Anotopterus pharao* Zugmayer dans l'estomac des germons. C. R. Acad. Sci., Paris 197:1261-1752.
Germo alalunga, Atlantic Ocean: food.

1934. La faune pélagique de l'Atlantique au large du Golfe de Gascogne recueillie dans des estomacs de germons. Première Partie: Poissons. Ann. Inst. Océanogr. 14:249-418.
Germo alalunga, Atlantic Ocean: food, bionomics, bibliography.

1936. La pêche du germon, son intérêt scientifique. Rev. Sci. 74(9):266-273.
Biology of *Germo,* methods of capture.

1937. Présence de *Parathunnus obesus* dans le Golfe de Gascogne. C. R. Soc. Biogéographie 13:66-67.
P.atlanticus: distribution; Atlantic Ocean.

1940. La faune pélagique de l'Atlantique au large du Golfe de Gascogne recueillie dans des estomacs de germons. Troisième Partie: Invertébrés (Céphalopodes exclus.). Parasites du germon. Ann. Inst. Océeaogr. 20:127-310.
Germo alalunga, Atlantic Ocean: food; parasites.

LETACONNOUX, R.
1950. Le germon (*Germo alalunga* Gmelin). Examen du nombre de branchiospines. Ann. biol., Copenhague 7:63. [P]
Meristic counts.

LOZANO, FERNANDO.
1950. Notas sobre el bonito del norte o albacora (*Germo alalunga* Gmelin) de Galicia. Bol. Inst. esp. Oceanogr. 36:1-13. [P]
Morphometrics, notes on sexual maturity, food, age, fishing season and catch, relation of albacore and sardine fisheries.

LÜLING, KARL H.
1950. Thunfischanlandungen am Hamburger Fischmarkt in der Schleppnetz- Heringssaison 1949. Fischereiwelt 2(4):57-9. [P]

LÜLING, KARL H.—Continued

Seasonal changes in frequency distribution of fish weights in German bluefin landings.

1951. Die Thunfischanlandungen in der Schleppnetz-Heringssaison 1949 und 1950. Fischereiwelt 3(6):90-2. [P]
Weight of landings and frequency distribution of fish weights in North Sea bluefin catch.

1952a. Thunfischbeobachtungen und Thunfischfang. Fischereiwelt 4(2):10-2. [P]
Thunnus thynnus: habits; fishing methods and gear; echo sounder record of tuna figured.

1952b. Die Thunfischanlandungen in der Schleppnetz-Heringssaison 1951. Fischereiwelt 4(3): 42-3. [P]
Seasonal changes in weight of landings and frequency distribution of fish weights in North Sea bluefin fishery.

MCHUGH, JOHN L.
1952. The food of albacore (*Germo alalunga*) off California and Baja California. Bull. Scripps Instn. Oceanogr. tech. 6(4):161-172. Also Contributions from the Scripps Institution of Oceanography, New Series, No. 562. [P]
Quantitative analysis of contents of 321 stomachs collected from northern California: variations in composition with latitude, year, season; compared with reports from other areas; indications of vertical distribution.

MCKERNAN, DONALD L.
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Results of semi-commercial fishing by a West Coast vessel at 33 stations between 140° and 153°W. Yellowfin catch rates, size of fish, cannery rejection rates.

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Scientific and common names of baitfish species of Micronesia; description; habitat; methods of capture; value as bait.

1939b. Fisheries of the South Sea Islands: natural food of skipjack and tunas. Nanyō suisan 5(7):12-14. [J,P]
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1939c. Tunas and the tuna fishery. Parts 1, 2, and 3. Appendix to Fisheries of the South Sea Islands. Nanyō suisan 53:14-22; 54:16-30; 55: 34-42. [J,P]
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Fishing logs; skipjack, bigeye, albacore catches recorded with surface water temperature and specific gravity, Japanese waters.

1930b. Skipjack fishing and oceanographic conditions. Mie-ken suisan shikenjō hōkoku (1927): 15-17. [J,P]
Skipjack fishing conditions discussed in relation to water temperature and specific gravity; Japanese waters, May-August; plots of two 100-mile oceanographic sections.

1930c. Investigation of tuna fishing grounds and guidance in fishing. Mie-ken suisan shikenjō jigyō hōkoku (1927):18-33. [J,P]
Longline fishing logs and station plots, Japanese waters; albacore, bigeye, black tuna, yellowfin catches recorded with surface water temperature and specific gravity; plots of two 100-mile oceanographic sections; fishing discussed in relation to oceanographic conditions.

1930d. Investigation of skipjack fishing grounds and guidance in fishing. Mie-ken suisan shikenjō jigyō hōkoku (1928):1-18. [J,P]
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1930e. Investigation of tuna fishing grounds and guidance in fishing. Mie-ken suisan shikenjō jigyō hōkoku (1928):19-33. [J,P]
Longline fishing logs and station plots, Japanese waters; albacore, bigeye, black tuna, yellowfin catches recorded with surface water temperature and specific gravity; plots of two 100-mile oceanographic

MIE PREFECTURE FISHERIES EXPERIMENT STATION.—Continued

sections; fishing discussed in relation to oceanographic conditions.

1950a. No. 1 Taiyō Maru's 2nd exploratory tuna fishing cruise in 1950. Mie sui shi jihō 165:8-12. [J]
Fishing conditions; Pacific Ocean - northwest.

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Fishing conditions; Pacific Ocean—northwest.

1950c. Outline of the skipjack fishery in 1950. Mie sui shi jihō 165:24-25. [J]
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1941. Fishes of South Seas. Tokyo, Unebi Book Co., Ltd. 416 p. [J]
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MIYAZAKI PREFECTURE HIGH-SEAS FISHERY GUIDANCE CENTER.
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Reports of 7 longlining cruises to South China Sea, Philippine, and New Guinea waters; complete fishing logs and operational information; catch rates, size composition, sex ratios and maturity for yellowfin and bigeye; water temperature at surface, 50 m., and 100 m.

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1951a. Estimation of age and growth of yellowfin tuna (*Neothunnus macropterus* Temminck and Schlegel) in Hawaiian waters. (Unpublished thesis submitted for the degree of Master of Science, University of Hawaii, Honolulu). [P]
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Descriptions and figures of livers of *T. thynnus, G. alalonga, P. obesus, Neothunnus albacora,* and *S. sarda;* liver morphology as a systematic character.

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1954. Data on dolphin, yellowfin tuna, and little tuna from East Africa. Copeia 1954 (1):14-16.
Morphometric measurements and sex of 11 *Euthynnus affinis* and 29 *Thunnus albacora* from the Mombasa area.

MOWBRAY, LOUIS L.
1935. Description of the Bermuda large-eyed tuna, *Parathunnus ambiguus,* n. sp. Government Aquarium, Bermuda. (Three-page, unnumbered, privately printed pamphlet.)

MURAYAMA, BINZŌ, and SHIRŌ OKURA.
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Catches of purse seiners fishing skipjack and black tuna off the Japanese coast; construction details of a 50-ton purse seiner.

MURAYAMA, BINZŌ, and SHIRŌ OKURA.—Continued
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MURPHY, GARTH, I., and E. L. NISKA.
1953. Experimental tuna purse seining in the central Pacific. Comm. Fish. Rev. U. S. Fish Wildl. 15(4):1-12. [P]
Description of gear, results of purse seining in vicinity of Phoenix, Line and Hawaiian islands; factors affecting success: weather, clarity of water, vertical thermal structure, behavior of surface schools of skipjack and yellowfin; use of livebait in skipjack purse seining.

MURPHY, GARTH I., and RICHARD S. SHOMURA.
1952. New tuna source: Fish and Wildlife Service's investigation reveals potential new grounds. Pan-Amer. Fish. 6(10):14-16. [P]
Results of experimental longlining in equatorial waters between 150° and 165° W. Yellowfin, bigeye, albacore, skipjack catches, total catch rates, geographical distribution; relation of upwelling to tuna abundance; possibility of commercial exploitation.

1953a. Longline fishing for deep-swimming tunas in the central Pacific, 1950-51. Spec. sci. Rep: Fish. U. S. Fish Wildl. 98:47 p. [P]
Description of longline fishing; horizontal and vertical distribution of deep-swimming tunas in equatorial waters; sex ratios and size composition of yellowfin, bigeye, albacore, skipjack; relation of upwelling to zooplankton and tuna abundance; commercial possibilities.

1953b. Longline fishing for deep-swimming tunas in the central Pacific, January-June 1951. Spec. sci. Rep: Fish. U. S. Fish. Wildl. 108:32 p. [P]
Results of experimental longlining in equatorial waters from 120°W. to 180°. Vertical and horizontal distribution of yellowfin, bigeye, albacore, skipjack; size compositions and sex ratios. Operational data and comparison of gear with shallow and deep float lines. Effect of wind on upwelling and tuna abundance.

MURRAY, J. J.
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1938. Preliminary report on the habits of the black tuna, *Thunnus orientalis* (Schlegel). Zool. Mag. 50(5):279-281. [J,P]

Description and figure of mature egg; gonads figured, distribution, sexual maturity, spawning areas and seasons.

1939a. Summary of an investigation of scombroids of Formosan waters. Taiwan suisan zasshi 288:22-26. [J,P]

N. macropterus, T. orientalis, P. mebachi, T. germo, K. pelamis, Euthynnus yaito, Kishinoella rara, Gymnosarda nuda, Auxis hira, A. maru: listed as occurring in Formosan waters; Japanese common names.

1939b. Report on the investigation of Thunnidae in Formosan waters. Taiwan sōtokufu suisan shikenjō shuppan 13:1-15. [Je,P]

Auxis hira, A. maru, Euthynnus yaito: classification; Japanese common names; synonymy. *Katsuwonus pelamis, Kishinoella rara, N. macropterus, Parathunnus mebachi, Thunnus germo, T. orientalis:* classification; description; distribution; synonymy; Japanese common names; figures of all except *N. macropterus, P. mebachi,* and *T. germo. N. macropterus*: spawning, morphometric data; compared externally with *N. itosibi* and *Semathunnus guildi. K. rara* compared externally with *K. zacalles;* spawning of *T. orientalis.*

1939c. Notes on differences between *Neothunnus macropterus* and *Neothunnus itosibi.* Taiwan suisan zasshi 288:27-32. [J,P]

N. *macropterus*: classification, morphometric data, synonymy; *Neothunnus* compared with *Semathunnus.*

1941. On the body temperatures of some species of Thunnidae and Istiophoridae. Suisan gakkwai hō 8(3):256-263. [J,P]

Yellowfin tuna, bigeye tuna, Formosan and Philippine waters; body temperatures compared with water temperatures at presumed depth of capture.

NAKAMURA, HIROSHI.—Continued

1943. Tunas and spearfishes. Kaiyō no kagaku 3 (10):445-459. (Pacific Oceanic Fishery Investigations Translation No. 47). [P]

Neothunnus macropterus, N. rarus, Parathunnus mebachi, Thunnus germo, T. orientalis: classification, distribution, food, Japanese common names, spawning.

1949. The tunas and their fisheries. Tokyo, Takeuchi Shobō. 118 p. (Translated as Spec. sci. Rep: Fish. U. S. Fish Wildl. 82.) [P]

Thunnus orientalis, Germo germo, Parathunnus mebachi, Neothunnus macropterus, N. rarus: anatomy, description, figures, classification, keys; general account of food, spawning, growth, migration, distribution of longline catch rates in western Pacific; fisheries, relation of fishing grounds to topography and oceanography, fishing seasons; bibliography. Similar material on spearfishes.

1951. Tuna longline fishery and fishing grounds. Tokyo, Takashima Shoten pub. 144 p. (Also published as Nankai Regional Fisheries Research Laboratory Rept. No. 1. Translated as Spec. sci. Rep: Fish. U. S. Wildl. 112) [P]

Compilation of research vessel longline catch rates for approximately 20 prewar years. Geographical and seasonal distribution of *N. macropterus, P. sibi, G. germo, T. orientalis,* and spearfishes in the western Pacific and Indonesian waters; average catch rates for each species plotted by 1° squares. Relation of fishing grounds and seasons to meteorological and oceanographical phenomena.

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1953. Size composition of the albacore and bigeyed tuna caught in the North Pacific area. Contrib. Nankai reg. Fish. Res. Lab. 1, Contrib. 12:6 p. [Je,P]

Length composition of longline-caught albacore and bigeye from the central North Pacific; discussion of age and growth, and of annual variations in size composition.

NAKAYAMA, TAKUZŌ.

1948. Calculation of the cost price in the tuna fishery. Suisankai 770:10-16. (In: Spec. sci. Rep: Fish: U. S. Fish Wildl. 79). [P]

Japanese tuna longline fishery; economic statistics.

NANKAI REGIONAL FISHERIES RESEARCH LABORATORY.

1951a. Report No. 1. 144 p. [J,P]

See Nakamura, Hiroshi, 1951. Contents are identical, but this Report has the text and the charts bound separately.

NANKAI REGIONAL FISHERIES RESEARCH LABORATORY.—Continued

1951b. Supplementary report no. 1:194 p. [J,P]
Distribution of albacore longline catch rates in the northwest Pacific by 1° squares, 1948-51; albacore length frequencies by month and area; survey of construction and dimensions of longline gear of numerous vessels, with area of employment and catch rates by species.

NAVARRO, FRANCISCO DE P., and F. LOZANO.

1950. Carta de pesca de la costa del Sahara, desde el Cabo Juby al Cabo Barbas. Trab. Inst. esp. Oceanogr. 21:24 p. [P]
Atún (*Thunnus thynnus* L.), patudo (*Parathunnus obesus* Lowe), rabil (*Neothunnus albacora* Lowe), bonito de altura (*Katsuwonus pelamys* L.), bonito del norte (*Germo alalunga* Gmelin), melva (*Auxis thazard* Lacep.): occurrence and fishing methods.

NAVAZ, JOSÉ M.

1950. Contribución al estudio de los escómbridos de la costa vasca (atún, bonitos, y melva). Bol. Inst. esp. Oceanogr. 31:21 p. [P]
Morphometrics, fishing seasons, catch of *Thunnus thynnus, Germo alalunga, Katsuwonus pelamis,* and *Auxis thazard* in the Bay of Biscay; bibliography; Spanish and Basque names.

NICHOLS, JOHN T., and F. R. LA MONTE.

1941. Yellowfin, Allison's, and related tunas. Ichth. Contr. Int. Game Fish Assn. 1(3):27-32 [P]
Neothunnus albacora, N. allisoni, N. catalinae, N. rarus: classification, description, English common names, key, synonymy. Provisional subspecies: *Neothunnus albacora macropterus, N. allisoni allisoni, N. allisoni itosibi,* and *N. rarus zacalles,* proposed.

NIGRELLI, ROSS F., and H. W. STUNKARD.

1947. Studies on the genus *Hirudinella,* giant trematodes of scombriform fishes. Zoologica, N. Y., 31(4):185-196. (Contribution No. 747, Dept. of Tropical Research, N. Y. Zoological Society).
Table 4: *Hirudinella* from scombriform fishes other than *Acanthocybium*: *Parathunnus atlanticus, Katsuwonus pelamis, Euthynnus alletteratus, Neothunnus macropterus, Thunnus thynnus.* Lists name of collector, host, locality and figure.

NISHIKAWA, SADAICHI.

1934. On the future of the high-seas skipjack and tuna fisheries and standards for their operating methods. Rakusui 29(4):20-22. [J]
Fishing methods and gear.

NISKA, EDWIN L.

1953. Construction details of tuna long-line gear used by Pacific Oceanic Fishery Investigations. Comm. Fish. Rev. U. S. Fish Wildl. 15(6):1-6. Also Separate No. 351. [P]
Description of gear construction.

NIWA, HITOMARO.

1937. On the pigments in the muscles of fishes. Rep. No. 1, Pigments of tuna muscle. Suisan kenkyū shi 32(6):306-313. [J]
Chemical analysis.

NOGUCHI, SADAMI.

1938. The Ogasawara Is., and the future of our tuna fishery. Suisankai 666:44-46. [J]
Pacific Ocean - northwest.

NOMURA, TOSHIZŌ, ET AL.

1952-3. Survey of the high-seas tuna fisheries based on landings at Misaki, Tokyo, and Yaizu. Reports of the following months' operations are in the indicated numbers of the Kanagawa suishi geppō: April and May 1952, 1:3-20; June 1952, 2:1-7; July 1952, 3:1-6; Aug. 1952, 4:1-10; Sept. 1952, 5:1-8; Oct. and Nov. 1952, 6:1-10; Dec. 1952 and Jan. 1953, 7:1-15; April 1953, 9:1-10; June 1953, 11:1-20; July 1953, 12:1-18; the reports of February and March 1953 operations were published as Maguro-rui mizuagechi chōsa (unnumbered, undated) by the Kanagawa Prefecture Fishesies Experiment Station; the report for May 1953 operations is in Report of survey for tuna fishing 1:1-22; the report for August 1953 operations is in Tuna fishing 4:17-32. [J,P]
Average catch rates for yellowfin, bigeye, albacore, bluefin, skipjack, and spearfishes reported by Japanese longline vessels from various areas of the western and central Pacific, Indonesian waters, and the Indian Ocean by months; plots of locations fished by the vessels investigated; discussion of fishing conditions in each area for the month; length frequencies of each species by area.

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1930. Report of experimental tuna fishing in the Kantō region (1927). Ōita-ken suisan shikenjō jigyō hōkoku (1927-28):1-40. [J,P]
Longline catches of yellowfin, bigeye, and black tuna off central Japan: morphometric data, body temperatures compared with water temperatures; gear construction, general account of tuna fisheries and bases of the region.

OKADA, YAICHIRŌ, and KIYOMATSU MATSUBARA.

1938. Keys to fishes and fish-like animals of Japan. Tokyo, Sanseidō Co., Ltd., p. 146-150. [J]
Auxis hira, A. tapeinosoma, Euthynnus alletteratus, E. yaito, Germo germo, Kat-

OKADA, YAICHIRŌ, and KIYOMATSU MATSUBARA.—Continued

suwonus vagans, Kishinoella rara, Neothunnus itosibi, N. macropterus, Parathunnus orientalis: classification, description, key, Japanese common names.

1953. Bibliography of fishes in Japan (1612-1950). Mie Prefecture, Faculty of Fisheries, Prefectural University of Mie, 228 p. [P]

General bibliography of Japanese and foreign literature on fishes which occur in Japanese waters; arranged by years, not annotated.

OKADA, YAICHIRŌ, ET AL.

1935. Illustrated atlas of Japanese fishes. Tokyo, The Sanseidō Co., Ltd.

Scomber tapeinocephalus, Auxis tapeinosoma, Sarda orientalis, Katsuwonus vagans, Euthynnus yaito, Thunnus orientalis, Germo germo, Parathunnus sibi, Neothunnus macropterus. All figured, briefly described, brief notes on distribution, habits and utilization; spawning.

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OKINAWA PREFECTURE FISHERIES EXPERIMENT STATION.—Continued

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1941a. The Australian tunas. Pamphl. Coun. sci. ind. Res. Aust. 104:48 p. [P]

Auxis thazard, Euthynnus alletteratus, Katsuwonus pelamis, Kishinoella tonggol, Neothunnus macropterus, Thunnus germo, T. maccoyi: distribution, description, key, figures, Australian common names, size groups, migration and spawning of *T. maccoyi;* length-weight relationship and internal and external differences of *K. tonggol* and *T. maccoyi* compared; livers of *K. tonggol* and *T. maccoyi* figured.

SERVENTY, D. L.—Continued

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Southern bluefin (*T. maccoyii*), albacore (*T. germo*), yellowfin (*Neothunnus macropterus*), striped tuna (*Katsuwonus pelamis*), bonito (*Sarda australis*): recorded; description of *N. macropterus*.

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Distribution, feeding habits, stomach contents, spawning.

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Distribution, description, ratios of various body proportions, internal anatomy, synonymy; compared with *K. zacalles, Neothunnus rarus, Thunnus nicolsoni, Thynnus tonggol;* figures of *T. tonggol* and *K. tonggol,* cranium of *K. tonggol* figured.

1947. A report on commercial tuna trolling tests in southeastern Australia. J. Coun. sci. ind. Res. Aust. 20(1):1-16.

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Auxis hira, A. tapeinosoma, E. yaito, Katsuwonus pelamis, Neothunnus macropterus, Parathunnus sibi, Thunnus germo,

SHAPIRO, SIDNEY.—Continued
T. orientalis: bibliography, distribution, Ryukyuan common names, migration, spawning of *K. pelamis*.

1948b. The Japanese tuna fisheries. SCAP Nat. Resour. Sect. Rep. 104:60 p. [P]
Katsuwonus pelamis, Neothunnus macropterus, Thunnus germo, T. orientalis: bibliography, classification, description, distribution, migration, food, habits, fishing conditions in relation to oceanography, figures, Japanese common names.

1950. The Japanese long-line fishery for tunas. Comm. Fish. Rev. U. S. Fish Wildl. 12(4):1-26. [P]
Details of construction, operation of gear.

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1951a. An annotated bibliography on the biology of Pacific tunas. Fish Bull., U. S. Fish Wildl. 52(58):1-58. [P]
Arranged alphabetically by author, and papers by the same author chronologically. Detailed subject index.

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Spawning of *Neothunnus macropterus* and *Parathunnus sibi;* records of juvenile *Katsuwonus pelamis;* occurrence of *Thunnus orientalis*.

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